

STRIDE

Southeastern Transportation Research,
Innovation, Development and Education Center



T+H

Transportation + Health

Green Modes of Travel

THE
CITADEL

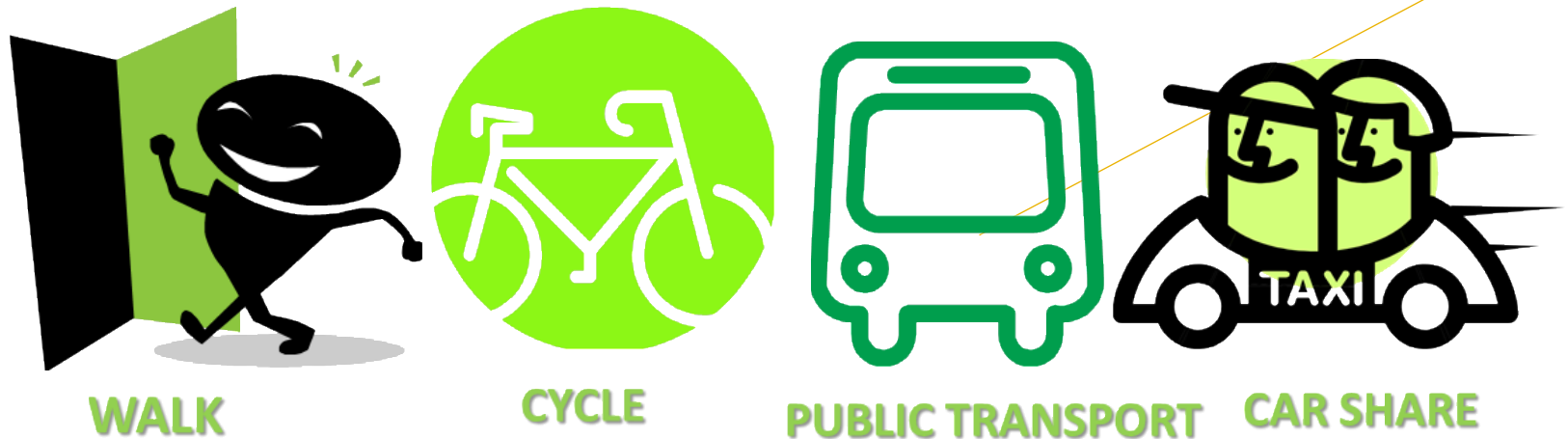


CIVL 642 Public Health, Physical Activity, and Design of the Built Environment



Green modes of travel

1. Mode choice & multimodal environments
2. Transit oriented development
3. Walking and walkable communities
4. Intro to Charleston elements of PA Plan



What is Green Transportation? - Green transportation focuses on:

- i.) efficient and effective use of resources,
- ii.) modification of transport structure to accommodate green modes,
- iii.) making healthier travel choices for individuals and communities.

- 1. Green Transportation Modes** – Pedestrians, Bicycles, E-bicycles, mopeds, motorcycles, hybrid cars, electric cars, multiple occupant vehicles, HOV, public transit, bus, train, tram, people movers.
- 2. Benefits of Green Transportation** – less pollution, more economical, improved fuel efficiency, more sustainable, better for environment, efficient use of transportation infrastructure, improved health, improved livability.
- 3. Pros & Cons of Green Modes:** <https://greenliving.lovetoknow.com/low-impact-living/what-are-most-earth-friendly-transportation-methods>
- 4. 10 Ideas for a Green Transportation Infrastructure:**
<https://science.howstuffworks.com/environmental/green-science/10-ideas-green-transportation10.htm>

Fundamentals of Mode Choice

1.) **Travel demand forecasting**, (refer to: *Transportation Demand Modeling slides*)

4 Step Process: 1. Trip Generation, 2. Trip Distribution, 3. Mode Split, 4. Trip Assignment

2.) **Transportation Planning** (refer to: *Transportation Planning slides*)

3.) **Benefits** of Building a Multimodal transportation network – provide mobility for:

- Youths 10-20 (10-30% of population).
- Seniors who do not or should not drive (5-15%).
- Adults unable to drive due to disability (3-5%).
- Lower income households burdened by vehicle expenses (15-30%).
- Law-abiding drinkers, & impaired people (small but important demand to serve).
- Community visitors who lack a vehicle or driver's license.
- People who want to walk or bike for enjoyment and health.
- Drivers who want to avoid chauffeuring burdens.
- Residents who want reduced congestion, accidents and pollution emissions

Multimodal Transportation Planning *(also ref ALR slides)*

Table 1 Impacts Considered and Overlooked

Usually Considered	Often Overlooked
Financial costs to governments Vehicle operating costs (fuel, tolls, tire wear) Travel time (reduced congestion) Per-mile crash risk Project construction environmental impacts	Generated traffic and induced travel impacts Downstream congestion Impacts on non-motorized travel (barrier effects) Parking costs Vehicle ownership and mileage-based depreciation costs. Project construction traffic delays Indirect environmental impacts Strategic land use impacts (sprawl versus smart growth) Transportation diversity and equity impacts Per-capita crash risk Public fitness and health impacts Travelers' preferences for alternative modes (e.g., for walking and cycling)

Green Transportation Hierarchy

1. Pedestrians
2. Bicycles
3. Public transportation
4. Service and freight vehicles
5. Taxis
6. Multiple occupant vehicles (carpools)
7. Single occupant vehicles

The Green Transportation Hierarchy favors more affordable and efficient (in terms of space, energy and other costs) modes.

Consider all significant impacts, including long-term, indirect and non-market impacts such as equity and land use changes. This should at least include:

- Congestion
- Roadway costs
- Parking costs
- Consumer costs
- Traffic accidents
- Quality of access for non-drivers
- Energy consumption
- Pollution emissions
- Equity impacts
- Physical fitness and health
- Land use development impacts
- Community livability



www.vtppi.org

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https://www.vtppi.org/multimodal_planning.pdf



Transportation Alternatives

<http://www.transalt.org/>

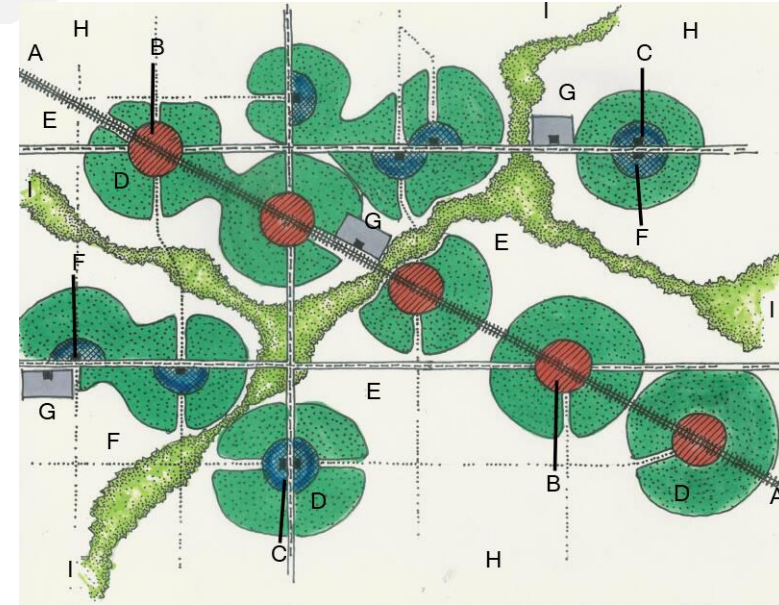
Estimated annual **hidden costs** borne by New York City non-motorists in 1990 were:

- \$2.9b for health and property damage from air pollution,
- \$2.5b for accidents,
- \$2.0b for appropriation of land,
- \$1.4b for noise,
- \$1.1b for time lost in congestion,
- \$300m for military costs allocable to defending oil supplies,
- \$300m present worth of future climate change costs,
- \$200m for damage to buildings and infrastructure from vibration from heavy trucks.

B. Ketcham and C. Komanoff, "Should Drivers Pay More?," Auto-Free Press, Nov/Dec 1992.

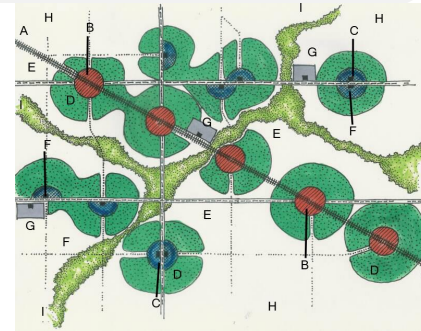
Factors Driving Trend toward Transit Oriented Dev.

1. Rapidly growing, mind-numbing traffic congestion nation-wide
2. Growing distaste for suburbia and strip development
3. Growing desire for quality urban lifestyle
4. Growing desire for more walkable lifestyles away from traffic
5. Changes in family structures: more singles, empty-nesters, etc
6. Growing national support for Smart Growth
7. New focus of Federal policy (\$16.6m pilot project)



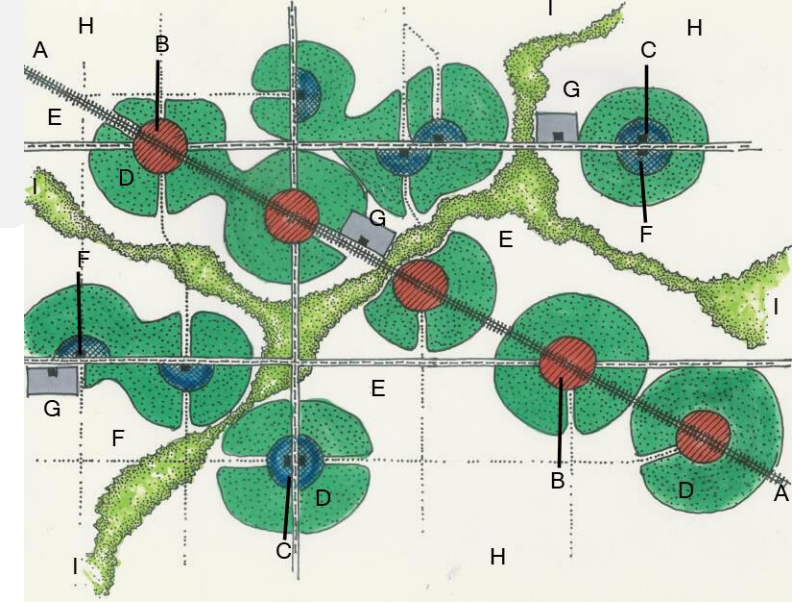
Components of Transit Oriented Development

1. Walkable design with pedestrian as the highest priority
2. Train station as prominent feature of town center
3. Public square fronting train station
4. Regional node containing mixture of uses in close proximity (office, residential, retail, civic)
5. High density, walkable district within 10-minute walk circle surrounding train station
6. Collector support transit systems including streetcar, light rail, and buses, etc
7. Designed to include the easy use of bicycles and scooters as daily support transport
8. Large ride-in bicycle parking areas within stations
9. Bikeshare rental system and bikeway network integrated into stations
10. Reduced & managed parking inside 10-minute walk circle around town center / train station
11. Specialized retail at stations serving commuters & locals including cafes, grocery, retail, etc.



Benefits Transit Oriented Development

1. Higher quality of life with better places to live, work, and play
2. Greater mobility with ease of moving around
3. Increased transit ridership
4. Reduced traffic congestion, car accidents and injuries
5. Reduced household spending on transportation, resulting in more affordable housing
6. Healthier lifestyle with more walking, and less stress
7. Higher, more stable property values
8. Increased foot traffic and customers for area businesses
9. Greatly reduced dependence on foreign oil, reduced pollution and environmental damage
10. Reduced incentive to sprawl, increased incentive for compact development
11. Less expensive than building roads and sprawl
12. Enhanced ability to maintain economic competitiveness



Transit Supportive Planning Toolkit *Benefits!*

6 Transportation Demand Management & VMT/GHG Reductions

- ✓ TDM Management Strategies
- ✓ Parking Management



1 Land Use

- ✓ Compact Design
- ✓ Complete Neighborhoods



2 Economic

- ✓ Increased sales tax and property tax revenues
- ✓ Reduced cost for city services



3 Transit/Mobility

- ✓ Support increased transit ridership
- ✓ Provide street and network connectivity
- ✓ Promote pedestrian and bicycle activity



4 Affordability

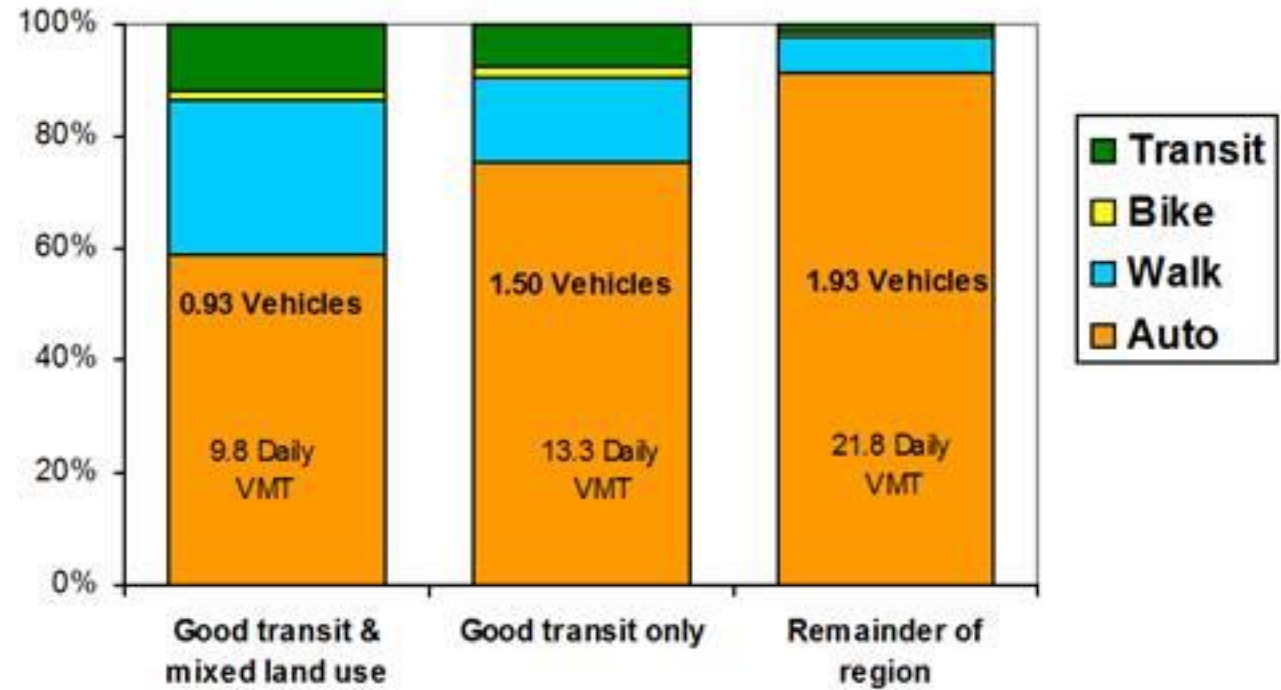
- ✓ Opportunities to provide affordable housing
- ✓ Promote/preserve local business



5 Health

- ✓ Activity levels
- ✓ Air quality

Mode Share



Los Angeles Metro, 2019

<https://www.metro.net/projects/tod-toolkit/>

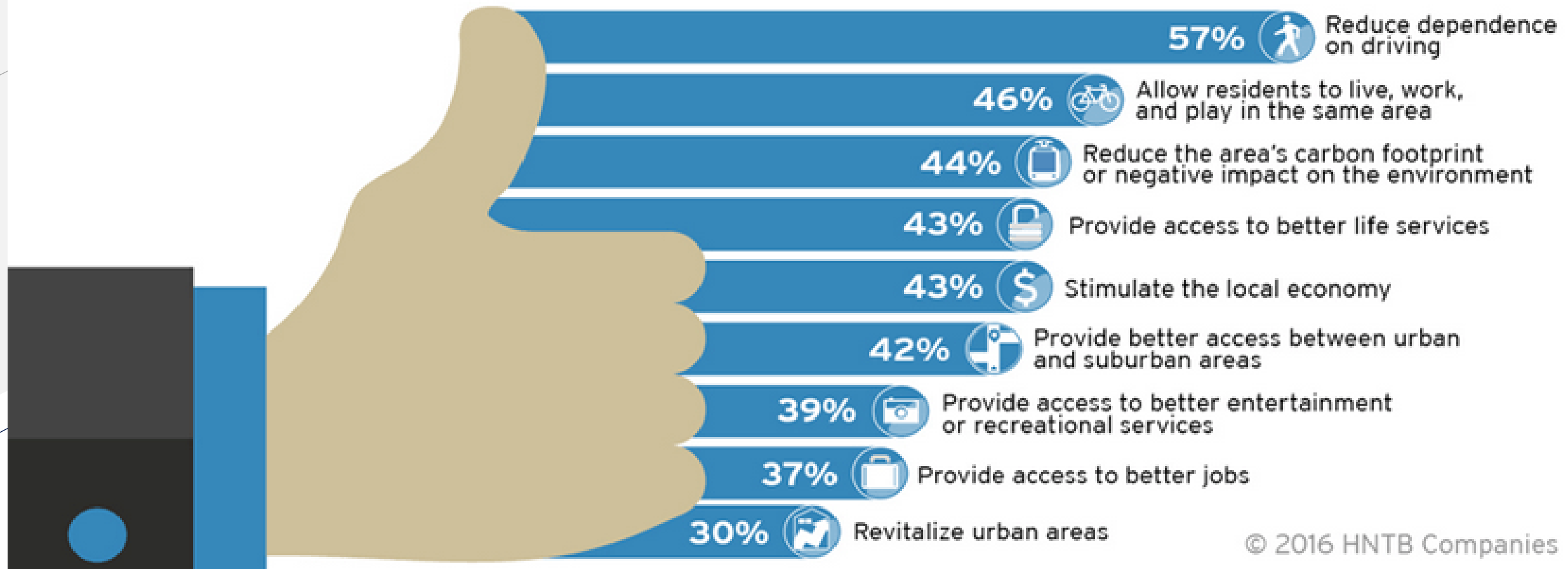
Victoria Transport Policy Institute, 2019

<https://www.vtpi.org/tDM/tDM45.htm>

Benefits of Transit Oriented Development

BENEFITS OF TRANSIT ORIENTED DEVELOPMENT

Americans believe transit oriented development provides an array of benefits ranging from lifestyle to environmental to economic.



Elements of Walkable Communities

1. Higher quality of life with better places to live, work, and play
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Elements of Walkable Communities

1. An array of differing destinations within 5-10min walk from home and work (walk score)
2. Streets design to enable and encourage walking
3. Pedestrian-Friendly Design with safety in mind
4. Convenient and well marked pedestrian crosswalks, including mid-block crossings
5. Street lighting for safe and secure walking environment
6. Street size (narrower) and block size
7. Pedestrian-Friendly Design to Make Walking Pleasant
8. Pedestrian-Friendly Design to Make Walking Efficient
9. Access to Public Transit
10. Traffic Calming features that slow motor vehicle traffic down
11. Buffers, landscaping, trees for shade, wayfinding, sense of place and amenities.
12. Enhanced ability to maintain economic competitiveness



US most Walkable Communities

Major Metropolitan Areas

Boston, Massachusetts

Chicago, Illinois

Minneapolis, Minnesota

New York, New York

San Francisco, California

Seattle, Washington

Washington, D.C.

Medium & Smaller Cities/Towns

Eureka Springs, Arkansas

Clayton, California

Boulder, Colorado

Glenwood Springs, Colorado

Dunedin, Florida

Savannah, Georgia

Naperville, Illinois

Portland, Maine

Annapolis, Maryland

Orion, Michigan

Duluth, Minnesota

Lincoln, Nebraska

Exeter, New Hampshire

Chautauqua, New York

Oakwood, Ohio

Waynesville, Ohio

Xenia, Ohio

Portland, Oregon

Mt. Lebanon, Pennsylvania

Chattanooga, Tennessee

Kingsport, Tennessee

Austin, Texas

Burlington, Vermont

Vancouver, Washington

Madison, Wisconsin



America's Walking, PBS, host Mark Fenton highlights great walking designations across US.

THE 3 D's: DESIGN. DEVELOP. DELIVER.

A Prescription for Physically Active Communities

People need safe, convenient places to be physically active.



1 DESIGN communities and streets that make being physically active safe and easy for people of all ages and abilities.

Examples include: Improved street lighting; continuity and connectivity of sidewalks and streets; projects to increase safety; consideration of proximity of residential areas to stores, jobs, schools, or similar locations.



2 DEVELOP or enhance access to places for physical activity.

Examples include: Create walking trails; provide access to new or existing nearby facilities.



3 DELIVER community programs that help adults be physically active.

Examples include: Social support interventions in community settings; health education classes.



U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

STEP IT UP!

EVERYONE CAN HELP
MAKE OUR COMMUNITIES
MORE WALKABLE



WORKSITES:

Implement workplace policies and programs to promote walking.

MEDIA:

Spread the word about walking and creating safe and easy places to walk.

PARKS AND RECREATIONAL AND FITNESS FACILITIES:

Provide access to green spaces and recreation areas.

SCHOOLS:

Implement safe routes to school and daily physical education programs.

INDIVIDUALS & FAMILIES:

Walk with friends, family, and work colleagues.

TRANSPORTATION, LAND USE, & COMMUNITY DESIGNERS:

Design safe and easy places to walk.

PUBLIC HEALTH:

Provide information to plan, implement, and evaluate walking programs.

HEALTH CARE PROFESSIONALS:

Talk to patients about physical activity.

VOLUNTEER & NONPROFIT ORGANIZATIONS:

Offer free or low-cost community walking programs.



Step it up! Help make your community more walkable. Learn how by visiting
www.SurgeonGeneral.gov



Transportation, Land Use & Community Design, pg 48

1. **Active design** principles into land-use, transportation, community, & economic dev.
2. **Mixed-use developments** that place common destinations within walking and bicycling distance of most residents
3. Greater investment in **bicycle/pedestrian infrastructure & public transit**
4. Institutionalize the **collection of data to inform policy** and to measure the impacts of active transportation on physical activity, population health, and health equity
5. Implement initiatives to **encourage, reward, and require** more walking, bicycling, and transit use for routine transportation



Green Modes of Travel

Thank You.

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